

# THE EFFECT OF STRENGTH CHARACTERIZED BY SPEED IN AIR RESISTANCE ON MAXIMUM SPEED & SOME BIOCHEMICAL VARIABLES OF CYCLISTS

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## Abstract

The world witnessed a great progress at all aspects and fields of life including sports field with rapid pace. This is clear through incredible results and records in these sport games and events. Cycling events (Race against Time) are the concern in this study in terms of applying a training course according to the nonoxygenic energy system needed for such events and the effect of this training course on developing some functional, skill and physical variables. This training is performed at the special preparation stage of cycling national team players. The application of these exercises is made on young players, and this age category gives accurate expression of any course to be applied on. In addition, energy economy during physical effort reflects positive sides in the adaptation processes of cardiac and circulatory systems, especially at the level of the heart in terms of heart muscle recovery, fast restoration and continuity of blood pumping with the same efficiency and spent energy.

**Keywords:** Strength characterized by speed, air resistance, maximum speed, bicycles

## 1. INTRODUCTION

The world witnessed a great progress at all aspects and fields of life including sports field with wide strides. This is clear through incredible results and records in these sport games and events including cycling events (Race against Time). Through training science, exercises are treated and chosen accurately as previous training courses and methods became unable to develop the game at present because plans and exercises need specialization and work by worker's energy which make it necessary for workers in this field in general and specialists in particular to work hard according to modern training means. Maximum speed necessitated that players have to perform the set exercises due to the nonoxygenic energy system in spending energy. This requires high speed and fitness. In other words, preparation of players should be at a level which qualifies them to compete in a race against time using bicycles and high fitness as players need continuous movement. With speed exercises, result of the study shows the development in both circulatory and respiratory systems in multiple variables. This is done by following-up training events since the beginning of the course according to training level and age category due to adaptation of circulatory and respiratory systems with types and characteristics of the game as well as enhancing performance intensity to cope with training according to the nonoxygenic energy system that shows the capacity of heart muscle to extend and contract. From a psychological point of view, AmerAllah, 1998 refers to training as: "a group of directed physical exercises or efforts which lead to make a functional adaptation or change in internal body systems and organs to achieve a high level of sport achievement" (Amerallah Ahmed Albosati, 1998, 2). In addition, energy economy during physical efforts reflects positive aspects in the adaptation process at both cardiac and circulatory system, especially the level of the heart in terms of heart muscle recovery, instant restoration, continuous blood pumping with the same efficiency and spent energy. Thus, the significance of the study came in applying a training course due to the nonoxygenic energy system needed by the event and the effect of this training course in developing some functional, skill and physical variables. This training is in the preparation stage related to cycling national team players as the application of these exercises is made on young players, and this age category gives accurate expression of any course to be applied on.

## 2. PROBLEM OF THE STUDY

The fall in achievement in the cycling race (race against time) in Iraq is due to insufficient general and private physical characteristics. These are among the main obstacles in the development of sport achievement. Muscular strength in general and strength characterized by speed in particular represent a main element that is a part and parcel in reaching achievement, especially events related to speed. This was discussed in many studies that proved a significant relation between strength characterized by speed and achievement. The use of effective means in raising capacities with accompanying biochemical changes require adaptation according to the effort exerted by athletes to achieve good level. The trainers who use classical means and do not use anything new and innovative due to the conditions witnessed by Iraq is still present in developing some physical variables of cyclists. This led the researcher to create a training method that helps to develop the strength characterized by speed which is

training with air resistance using an (umbrella) in order to solve one of the problems of our trainers which is the lack of assisting training means attempting to give good results.

### Objectives of the Study

1. Define the effect of training with air resistance using an (umbrella) on developing strength characterized by speed for short distance runners.
2. Define the effect of training with air resistance using an (umbrella) on maximum strength and some biochemical variables of cyclists of (race against time).

### Hypotheses of the Study

1. There are significant differences of strength characterized by speed and maximum speed for the experimental sample of the study between pre and post tests for the sake of post test.
2. There are significant differences of biochemical variables of the experimental sample of the study between pre and post tests for the sake of post test.

## 3. METHODOLOGY

The researcher used the experimental method by designing a single group as it is proper for the nature of the study.

### Population & Sample of the Study

One of the important aspects for the researcher is to determine the sample and subjects of the study. Thus, the population of the study was selected purposively represented in cycling national team junior players (6 players) representing 100% of the population.

### Sample Homogeneity

In order to determine homogeneity of the study sample in some variables that affect its results, the researcher extracted skewness coefficient for (weight, length and training age), arithmetic mean, Standard Deviation SD, standard error for (weight, length and training age) related to the study. The table shows that values of skewness coefficient between (-3 and +3), so the study sample became homogeneous in the mentioned variables.

**Table (1) showing statistical, measuring units, coefficients in standard, standard error, standard deviation and skewness coefficient:**

Statistical description Variables	Arithmetic Mean	S.D	Median	Standard Error	Skewness Coefficient	Type
Age	17.22	2.05	17	0.45	0.25	Random
Weight	72.11	6.70	72	4.20	0.45	Random
Full Length	176.46	3.56	175	2.47	0.46	Random

### Field Procedures of the Study

The researcher performed pre-tests for the sample of the study, and then he applied the course which is about exercises by umbrella after 60 days (3 training units a week). Next, post-tests for the sample of the study were performed to determine the development of functional and physical variables.

### Exercises (Annex 1):

- A- Preparing physical training in order to develop muscular strength (explosive strength and strength characterized by speed)
- B- Preparing training in the main part of the course prepared by the researcher
- C- Training intensity between 75% and 95% for the group

The researcher used heart rates as indicators for rest within repetitions and groups. the number of heart beats within repetitions was (130 – 140 beats / min) that equals (3 – 4 minutes).

- D- Rest within groups (between 110 and 120 beats / min) that equal: (4 – 5 minutes).

- E- Performing exercises in a consecutive way with legs provided training conditions and characteristics with different percentages of intensities, sizes and rests to be consistent.

### Discussion and Analysis of Results of Pre and Post Tests of Empirical Group

**Table (2): arithmetic means, standard deviations, counted and tabulated T-values in pre and post tests for functional variables, physical capacities and achievement of the empirical group.**

Statistical treatments Variables	Measure Unit	Pre-tests		Post-tests		Counted T Value	Significance
		Mean -	S.D	Mean -	S.D		
Heart Rate	beat/min	177.45	4.457	165.156	1.345	7.769	Significant
VOX mas		38.45	1.45	46.65	0.435	13.187	Significant
Maximum Strength	Kg	85.75	5.58	96.30	1.87	3.78	Significant
Explosive Strength	Min	2.78	0.15	2.85	0.17	8.56	Significant
Max Speed (achievement in race against time)	Time	43,53	1.65	39.34	0.60	10.56	Significant

Table (2) shows that there is a development in functional variables (heart rate, VO<sub>2</sub> MAX) for cyclists (race against time) and there are significant differences between pre and post tests for the sake of post-test. The researcher found that this is because during performing the training for long periods with deep breath double respiratory muscular strength and lungs size on one hand. On the other hand, gradual intensity in training units has also a positive effect. This positive effect was shown in developing heart rate through heart and blood circulation adaptation towards raising functional capacity of this system. This leads to a positive effect on the level of sport achievement and its extendibility as a result of the big heart size for athletes reflected on functional apparatus including the increase of heart rates in the single minute and times of respiration due to accumulations and effects through continuous training in the training unit. This was asserted by Mathews and E. Fox (proper training leads to heart rate reduction) (Mathews and E. Fox, 1977) and they also said: (continuous and regular training by athletes lead to heart rate reduction during rests). This was also asserted by (Kamal Darwish and Mohamed Sobhy Hassanein, 1984, 101) who said that the heart rate reduction for athletes is a proof of development which results in continuous application of training loads which, in turn, lead to enhance heart operation and increase heart defense and operation with more economical manner). Reduction of heart rate in the test after course using the increase in VO<sub>2</sub>max shows the respond to the oxygen need and reduce the amount of oxygen debt in the pre-test prior to the course. In addition (Allawi and Aboeela, 1984) add that sport training leads to changes in lung sizes. These changes, in turn, lead to similar changes in vital capacity which gives great importance to the capacity of athletes to breathe amounts of air and in a little and deep number of respiration times in a single time unit.

All of this returns for the benefit achieved by the followed course. In addition, the rapid beat of respiration in the work field is due to changeable conditions. Here, we mean that during training and shifting work due to a certain energy system to another or to matches. This leads to difference in types of movement rhythms in a way that serves economical movement (Kasem Hassan Hussein, 1990, 126). This was asserted by (G. A. J. Crane, 1986) as he referred that strength of respiratory muscles increases during contraction during practicing sport activity regularly. This leads to extension of chest and makes more air enter inside, so the size of extension air increases, respiration depth increases, gas exchange between vesicles and blood improves and respiration times in a minute are reduced. All of this reflected on results of post-test as it was noticed that there was a reasonable development in means of this test. it was also noticed that the rate was developed and became efficient after the use of training course.

As for physical variables, “maximum strength, explosive strength, maximum speed (race against time)”, differences were significant between pre and post tests. The researcher found that the reason of this escalation in achievement level is due to the effect of the proposed training course on members of the study sample. This shows that the exercises achieved their goal. It is known that strength and its different types do not develop automatically and randomly, but they develop through regulated and planned training due to scientific formula, suitable and correct selection of the used exercises to develop this characteristic. This is especially found (extra load exercises) whether using weights or body weight as they have direct effect on strength characterized by speed. This fact was referred to by many specialists and experts in this field including Mohamed Hassan Allawi and Mohamed

Nasreldin Radwan who said that regular training of extra loads and weights may contribute to improve strength characterized by speed. Yet, the development of strength characterized by speed whether by arms or legs requires regular repetition of training as the increase in repetition should be regular and gradual. Since the researcher used the correct training method in developing this characteristic depending on regular repetition increase especially when the attacker's attempt to penetrate with or without the ball, so he repeats the training once again. All of this led to the development of this physical characteristic as asserted by Kasem Hassan Hussein and Mansour Gamil Al Anbaki (Kasem Hassan Hussein and Mansour Gamil Al Anbaki, 1988, 115).

The development of strength characterized by speed requires repetition of training for multiple times in a single series. It should be asserted that this is applied on muscles that operate in sport events. It is known that each sport event depends on certain muscular groups that differ from a game to another according to the specialist sport. Basket ball is one of the games whose players are characterized by greatly strong arm and leg muscles. Therefore, it was necessary to consider these groups through regular repetition of training and gradual increase in repetitions as results from the used training method (man-to-man defense) proved that it was successful in developing strength characterized by speed through training repetition within the single training unit for many times which led to develop this physical character. The nature of this method requires performance of training on the sample of the study in maximum possible strength and the shortest possible time which means working to link strength with speed together as strength characterized by speed develops through training on linking strength with speed. Accordingly, this leads to increase consistent capacity between both of them. This characterizes cyclists, so the researcher considered giving gradual exercises to keep the level of physical capacities development using average intensity training which led to the development of achievement level through results of the study. Osama Riad, 1998, 65 agrees with this study as training on average distances fixed at a minute and a half above average intensity and load training helps develop and enhance physical capacities and increase in achievement level through reduction of the distance, so the hypothesis of the study is achieved saying that the proposed training course has an effect on physical capacities.

#### 4. CONCLUSION

- Strength exercise which characterized by speed in air resistance affected in development of max speed of cyclists race.
- Strength exercise which characterized by speed in air resistance in maxima's velocity affected in development of some chemical variables of cyclists.

**A Model of a Weekly Training Course**

Day	Total Time	Repetition	Intensity	Rest	Within	Circulation	Formation	Notes
			Repetition	Group				The use of umbrella in circulation during repetitions: (M: minute), (RE: Recovery), (Z: double formation) and (T: consecutive formation)
Saturday	60M	*2(3*1M)	6m	M3	10M	110-130	Z, T	
	30M		RE					
Monday	60M		1 m			80 – 100	Z	
Wednesday	M90	3*(3*3)	5 – 6 m	3M	10M	110 – 130	Z.T	

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